

THE BEEET



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Tucson Meeting Sponsored by Student Branch of Microwave Theory and Techniques:

Convex Optimization for Optimal Design and Analysis of Small Antennas

Speaker: Mats Gustafsson, Department of Electrical and Information Technology, Lund University, Sweden

LOCATION: University of Arizona, Room ECE 107

DATE: Tuesday Oct 22, 6:00 pm

Refreshments Provided (pizza and soft drinks)

INSIDE THIS ISSUE

General Meeting Announcement	1
Message from the Section Chair	2
Chapter News	3
We Need to Hear from You!	4

ABSTRACT

Design of small antennas is challenging as the Q-factor, efficiency, and radiation resistance must be controlled simultaneously. In this presentation, convex optimization together with integral expressions of the stored electromagnetic energies are used to analyze many fundamental antenna problems. The solutions to the convex optimization problems determine optimal currents, offer insight for antenna design, and present performance bounds for antennas. We present several optimization formulations such as maximal gain Q-factor quotient, minimal Q for superdirectivity, minimal Q for given far field, and efficiency. The effects of antennas embedded in structures such as mobile phones are discussed. Results are shown for various antenna geometries and compared to state of the art designs showing that many antennas perform almost optimally. A tutorial description of a method of moment implementation together with a Matlab package for convex optimization to determine optimal current distributions on arbitrarily shaped antennas is also presented.

BIOGRAPHY

Mats Gustafsson received the M.Sc. degree in Engineering Physics 1994, the Ph.D. degree in Electromagnetic Theory 2000, was appointed Docent 2005, and Professor of Electromagnetic Theory 2011, all from Lund University, Sweden.

He co-founded the company Phase holographic imaging AB in 2004. His research interests are in scattering and antenna theory and inverse scattering and imaging with applications in microwave tomography and digital holography. He has written over 65 peer reviewed journal papers and over 85 conference papers. Prof. Gustafsson received the Best Antenna Poster Prize at EuCAP 2007, the IEEE Schelkunoff Transactions Prize Paper Award 2010, and the Best Antenna Theory Paper Award at EuCAP 2013. He serves as an IEEE AP-S Distinguished Lecturer for 2013-15.

Message to the Tucson Section

By Joseph Wu

I'd like to invite everyone in the Tucson Section to participate in IEEE. In the last year, we've conducted activities for schools, the University of Arizona, and for you, the membership. These activities are a great way to get involved in IEEE and show the impact of engineers in our community.

We have a great core of volunteers but we could always use your help. I'm asking people to get involved. With more people the Tucson Section could do so much more for the membership and this community.

If you're interested in helping out or becoming an officer, contact us through the following website:

<http://ewh.ieee.org/r6/tucson/>

Become an IEEE Senior Member!

Do you want to become a senior member of the IEEE? The IEEE wants to promote qualified candidates to senior membership! If you have 10 years of professional experience of which five years of significant professional performance, you are qualified for a senior member upgrade. Educational experience such as a bachelor's degree in an IEEE-designated field counts 4 years to that number, a master's degree counts 5 years and a doctorate counts 6 years. In order to find out more, point your web browser to www.ieee.org and search for senior membership!

Senior Membership:

<http://www.ieee.org/web/membership/senior-members/>

Applications can be found online. You will need the references of three current senior members or fellows. If you need assistance, contact Joseph Wu at joewu@ieee.org.

Save the date....

The next meeting is set tentatively for:

Date: Nov. 19 2013
 Time: 6:00 PM to 7:30 PM
 Location: ECE 102, University of Arizona

"Design, Analysis, and Applications of
 Waveguide-Fed Slot Arrays"
 Sembiam R. Rengarajan,
 California State University
 Northridge, CA

Reliability Chapter Forming

A group is collecting signatures for a petition to form a Reliability Society Chapter for Arizona, pulling in IEEE members from the Tucson, Phoenix and Sierra Vista sections. If you are an IEEE member, but not a Reliability Society member, you can join the RS by paying half price (\$17) to sign and help form the chapter. If you are a member of IEEE Reliability Society interested in signing the petition please contact Lou Gullo at Louis.Gullo@ieee.org.

Keep Up with the Tucson Section: Join our email list!

The Tucson Section email list delivers the latest IEEE Tucson news right to your email box. To join, simply send an email to

listserv@listserv.ieee.org

Put the following in the body of the message:

[subscribe TUCSON-SECTION-ALL yourfirstname yourlastname](#)

You'll receive an email with instructions for confirming your new subscription.

Other News

Upcoming Conferences

2014 IEEE International Workshop Technical
 Committee on Communications Quality and
 Reliability
 18 May - 23 May 2014
 Westward Look Wyndham
 Tucson, AZ
www.ieee-cqr.org

2014 IEEE International Symposium on
 Parallel & Distributed Processing Symposium
 (IPDPS)
 19 May - 23 May 2014
 Arizona Grand Resort
 Phoenix, AZ
www.ipdps.org

U of A Student Branches

In the Tucson Section, there are active student branches. The Student Branch Chapter of the MTT frequently brings in speakers from the distinguished lecturer series.

The U of A main student branch is also active. They have been running an open lab space in the ECE department, helping out various senior projects, and even putting together an Arduino workshop in their spare time.

If you're interested in finding out what they do, or want to help out with a donation go to:

<http://uaieee.com>
<http://www2.engr.arizona.edu/~mtt/>

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To report address changes:

address-changes@ieee.org

Other record changes (typographical errors)

record-changes@ieee.org

Other membership issues including subscriptions

member-services@ieee.org

General IEEE Information

1-800-678-IEEE(4333)

We need to hear from you!

How can we make IEEE a better organization? We can only do it with your help. As a volunteer organization, IEEE depends on your participation to accomplish all of our goals.

As you can see from this newsletter, there are lots of activities where you can actively contribute. Are you good at organization? Volunteer to head one of our Chapters or to help organize our general meetings. Want to show off or improve your internet skills? Volunteer to help with our Web site. Interested in promoting our field to the next generation of engineers? Help with Engineers Week, or as a judge for any of our student competitions.

Even if you only have a little bit of time, there's sure to be an IEEE opportunity that will interest you. Even if you have no free time at all, but have ideas for meetings or activities that promote engineering and the IEEE, let us know! We'd like to hear from you. Please contact Joseph Wu at joewu@ieee.org.

We're on the Web!

Visit us at:

<http://ewh.ieee.org/r6/tucson>